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ABSTRACT

Occupational competency evaluation through written and performance tests assures that prospective vocational teachers possess the level of competence essential for effective teaching. The overall purpose of this project is to develop occupational competency examinations for nationwide use in evaluating trade and industrial education teachers. This second phase of a two-phase project involves: (1) directions for area test center coordination, (2) actual test development by procedures field tested in phase one, and (3) administration of written and performance tests. Each section includes the function of the individuals involved, sequence of the procedures, specific examples that show results of the various steps, and sample work sheets. Several illustrations and worksheets are provided throughout the publication. Related documents are available as ED 051 378, and VT 014 260 in this issue. (GEB)

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NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

A Consortium for Occupational Competency Testing
of Trade and Industrial/Technical Teachers

PHASE II

DIRECTIONS FOR: • AREA TEST CENTER COORDINATION
• TEST DEVELOPMENT
• TEST ADMINISTRATION

by Dr. Adolf Panitz and Dr. C. Thomas Olive

Research Project Grant Number 8-0474 to
Department of Vocational-Technical Education
Graduate School of Education, Rutgers - The State University
New Brunswick, New Jersey

by the U. S. Department of Health, Education and Welfare
Office of Education
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by the U. S. Department of Health, Education and Welfare
Office of Education
National Center for Educational Research

April 1, 1971

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PLANNING COMMITTEE

Project Director: Dr. C. Thomas Olivo
Associate Director: Dr. Adolf Panitz

PRINCIPAL INVESTIGATORS

Dr. Carl Schaefer - Chairman
Department of Vocational Education
Graduate School of Education, Rutgers University

Dr. Melvin Barlow - Director
Division of Vocational Education
Graduate School of Education
University of Southern California at Los Angeles

Dr. Richard Nelson - Chief
Bureau of Industrial Education
California State Education Department

REPRESENTATIVE LEADERS

Walter Bialobrzeski - Connecticut
Merle Strong - Wisconsin
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Byrl Shoemaker - Ohio
Gordon McMahon - New York
Edward Hankin - Jamaica, W. I.
Calvin J. Cotrell - Ohio Center
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Ex-Officio:
Lawrence Braaten - Washington, D. C.

INTRODUCTION

Vocational education includes preparation for a wide range of occupations. The teachers for vocational programs must be recruited from industry and allied fields. Occupational competency evaluation through written and performance competency tests assures that prospective vocational teachers possess the level of competence essential for effective teaching in various vocational programs.

While there are many occupational areas with certain characteristics which require special considerations, the overall effort of the National Occupational Competency Testing Project requires a test development procedure consistent for all tests to be developed under its sponsorship.

During Phase I of the project such a procedure was developed and field tested. It has been refined by the project staff, reviewed by the Principal Investigators and Planning Committee, and adopted for the development of the tests scheduled for Phase II.

This material consists of three parts: Part One covers the directions for area test center coordination, Part Two relates to the actual test development, and Part Three the administration of written and performance tests. Each section includes the function of the individuals involved, sequence of the procedures, specific examples that show results of the various steps, and sample work sheets. These directions have been prepared with the intent to facilitate test construction effectively and efficiently according to a uniform procedure.

Dr. Carl Schaefer

New Brunswick, New Jersey
April 1971

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PART ONE

AREA OCCUPATIONAL COMPETENCY TEST CENTER COORDINATION

I. DIRECTIONS FOR THE AREA TESTING CENTER ADMINISTRATOR

A. The Area Test Center Concept

The area occupational competency test center serves as the regional representative for the National Occupational Competency Testing Program. At the present time each test center will develop one or more written and performance tests for a selected occupational area. Eventually, these centers might function as the regional agency through which all available tests are administered for a geographic area.

It must be emphasized that the centers currently identified are serving as pilots. The numbers, location and administration of Area Occupational Competency Testing Centers will be consistent with plans developed by the Consortium of States, with freedom of acceptance and participation determined by individual states.

B. Utilization of Test Results

The occupational competency test results will serve three major purposes of which the area test center coordinator must be aware. The results may be used as:

1. a prerequisite for admission to a preservice or in-service industrial teacher education program, and/or

2. a regular means for temporary and/or permanent certification, and/or

3. the basis for granting college credit for specialization content areas in degree programs.

The results of such tests are also used for prognostic and diagnostic purposes to determine weak or deficient content areas which the candidate needs to correct or improve.

C. The Role of the Area Test Center Coordinator

The overall responsibility for developing the written and performance test rests with the area test center coordinator. He must

1. organize the planning committee,

2. provide the direction for the work of the planning committee,

3. select the individuals competent to make the content analysis and write the test items,

4. arrange for the necessary clerical and other technical service,

5. arrange for the physical facilities to try out or pilot test the written and performance tests,

6. arrange for the revision and correction of the tests for final copy,

7. select the examiners and proctors for the pilot testing of the written and performance tests,

8. administer the test and be responsible for reporting results, and

9. act as coordinator between the individuals involved in test development and the National Project.

D. Materials to be Developed and Coordinated as Part of the Test Development Procedure

The final Written and Performance Tests must be supported by the following activities and materials:

1. A listing of job titles in clusters of the occupation according to major job level classifications and the levels of competency to be tested;

2. A determination of job cluster levels for which competency is to be determined;

3. An analysis of the job clusters showing the manipulative skills, methods, procedures and the necessary occupational and related technical information that constitute competence at the journeyman level or its equivalent;

4. The Scope of the examination for the written and performance test; (This is information for the candidate.)

5. The Written Examination, including an alternate form;

6. Test Rating Form for the Written Examination;

7. The Performance Examination, including an alternate form:

   a) Performance Evaluation Form

   b) Directions to the Candidate

   c) Directions to the Examiner, pertaining to setting up machinery, equipment, etc., and the materials required for the performance test

8. Completed Answer and Evaluation Form for all candidates for statistical evaluation.

E. Suggested Organization of the Planning Committee

1. Such a committee should consist of representatives from industry, teacher educator, qualified vocational teacher and a test specialist.

2. Such a committee should not exceed seven in number.

3. Various branches of the industry or occupational area should be represented.

4. Care should be exercised that the members of the committee are drawn from as wide a geographic area as is practical to represent sectional differences in the occupation, if they exist.

F. The Responsibility of the Planning Committee

The members of the Planning Committee must be provided with an outline of the work to be completed and the results expected. The outline should include specific tasks to be completed by the members of the committee:

1. Developing an overall statement of test purpose and objective of the examination,

2. Defining Job Clusters for the occupational areas to be tested,

3. Setting of proficiency levels within the Job Clusters area which are to be evaluated by the tests,

4. Establishing certain standards against which test results are to be evaluated,

5. Providing direction for the analysis of the occupational skills, knowledge and information from which the scope, test grid and examination items are to be developed.

G. Report and Work Forms for the Committee

Illustration 1 (following page) is a sample of the Planning Committee Work Schedule.

Work Sheet I has been effectively used to report the work of the Planning Committee.

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

Illustration 1

Planning Committee Work Schedule

Meeting Date _____ Place _____ Time _____

Participants _____ _____

_____ _____

_____ _____

_____ _____

1. Development of Test Purpose and Objectives of the Written Examination for ____(Occupational Area)____.

2. Listing and Grouping of Job Clusters to be considered for the Examination:

   Resources: Dictionary of Occupational Titles -
   Listing of Occupational Programs of the U. S. Office of Education -
   Job Descriptions of Employer and Trade Associations.

   These complement the occupational analyses of the test developer.

3. Defining of Competency Levels of the Job Clusters:

   The job levels to be included for content analysis.

4. Defining the scope and directions for the skills, technical and related occupational information from which the examination items, performance test tasks, evaluation form and instructions to candidates and examiners must be developed.

WORK SHEET I

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

SUMMARY REPORT OF PLANNING COMMITTEE

Title of the Examination _____ Time Limit _____

The Written Examination in _____ includes

_____ test items of the multiple-choice form.

The test items are prepared for the following occupational areas and competency levels.

Major Area	Competency Level	Number of Test Items
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

A sufficient number of test items must be prepared to provide for alternate forms of the examinations.

The Performance Examination in _____ is of the

Finished Product or Troubleshooting type.

Time Limit _____

Overall Objectives and Scope of the Examination: _____

_____

_____

_____

_____

II. OCCUPATIONAL JOB CLUSTER PROCEDURE

A. Determination of Job Titles in a Job Cluster

The occupational job clusters constitute the framework for any occupational competency examination. Care and effort must be devoted to the identification of jobs which form an occupational job cluster. A thorough analysis of job titles, the skills and related technology represents the first step. This can be done from an assessment of Dictionary of Occupational Titles, job descriptions by employers, other U. S. Department of Labor sources, and trade groups.

These occupational job clusters must show the relationship of the jobs to each other and the varying degrees of competence in an occupational area. For example, in the Machine Industries Occupations there are specialist operators, all-around operators, setup men, skilled tradesmen (Machinist - Tool and Die Maker), and Technicians. Illustration 2A shows an example of Job Cluster Groupings according to estimated interrelationships for the Electronic Industries Occupations (Communications).

B. Determination of Proficiency Levels

The proficiency levels set the range for the test items to be developed. The occupational job clusters enable the committee to identify the proficiency levels which are to be evaluated. Illustration 2A shows the job clusters established by the committee for which test items for the Written Test and the Performance Test are to be prepared. Levels II, III and IV were identified as the range of competency to be evaluated. Work Sheet II is suggested for the listing of the major areas and their subdivisions for test item writing. This work sheet provides the common elements for all levels and the additional items that distinguish the levels of competency.

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
JOB CLUSTER FOR FIVE MAJOR LEVELS OF OCCUPATIONAL PROFICIENCY
FOR ELECTRONIC INDUSTRIES OCCUPATIONS (COMMUNICATIONS)

Illustration 2 A. Job Cluster Levels for Which Test Items Must Be Developed

Level I	Level II	Level III	Level IV	Level V
Electronic Assembler 726.781	T.V. Installation 823.781	T.V. Service and Repair 720.281	Transmitter Maintenance F.C.C. 1st Class License	Radio Engineer T.V. Engineer 003.081
Electronic Assembler Development 726.781	T.V. Chassis Inspector 720.687	Component Inspector Technician 828.281	Mobile Communications Equipment F.C.C. 2nd Class License	Electronics Technician 003.181
Electronic Mechanic Apprentice 828.281	Electronic Sensing Equipment Assembler 716.884	Radioactive Instrumentation 828.281	Microwave Technician	Systems Testing Laboratory Technician 003.181
Radio Mechanic 823.281	Radio Equipment Installer 823.281	Electronic Sound Technician 024.288	Two-Way Radio Communications Technician	
Radio Mechanic Helper 823.884		Public Address Serviceman 823.281	T.V. Transmitter Maintenance	
T.V. Repairman Apprentice 720.281		Radio Repairman Domestic 720.281	Transmitter Assembler 726.884	
		Electronic and Radio Work-Up Man 825.381	Customer Engineering Specialist 828.281	
		Radio Mechanic Troubleshooter 720.281	Sound Technician 024.288	
		Radio Mechanic 823.281		
		Electronics Mechanic 828.281		

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

WORK SHEET II

JOB CLUSTER LISTING IN RELATED GROUPS AND LEVELS OF COMPETENCE				
Level I	Level II	Level III	Level IV	Level V

ERIC

III. PREPARATION OF THE SCOPE OF THE EXAMINATION

A. Grid or Content Specification

The content analysis provides the total competence content of the Job Clusters. A test merely represents a sampling through selected items of the overall competence.

A grid or specification provides the framework around which the test is built. It consists of a grouping of major areas of the content of the cluster of occupation. The planning and/or test item development committee will assign priorities to each grouping to show their importance. These priorities, expressed in percentages (Group A - 15%, Group B - 25%, Group C - 5%) of the total examination show the significance and relationships of the groupings to each other and their part in the total competence of the occupation.

This grid serves, also, as the scope of the examination which must be provided for the candidate who wishes to take the examination.

Illustrations 3 - 4 - 5 represent the scope of the written and performance examination which is provided to the candidate.

Work Sheet IV serves the planning committee to develop a complete scope for the written and performance examination.

B. Length of the Written Examination

While it is difficult to determine the exact length of an examination, experience has shown that a range of 135-165 test items produces satisfactory results in terms of sampling, reliability, and validity. For occupations involving great variety of skills and information, the upper range will provide better results; for those with fewer major areas, the lower limit is satisfactory. A somewhat arbitrary choice will have to be made for each occupation cluster. The number of test items for each major area are determined from the grid.

Example - Machine Occupations - Assumed number of test items: 164. For the Milling Processes and Machines area, the planning committee assigned 17% of the total test items. Therefore, no less than 28 test items will have to be developed for this area.

No. of test items for area = Total x percent
N = 167 x 0.17 = 28

Illustration 3

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
OCCUPATIONAL PROFICIENCY EXAMINATION
MACHINE INDUSTRIES OCCUPATIONS (MACHINE TRADES)

DIRECTIONS TO THE CANDIDATE

Scope of the Written and Performance Examination

Occupational proficiency examinations are used, in conjunction with other criteria, for a single or for a combination of purposes:

1. Admission to trade and industrial/technical teacher education programs

2. To meet state requirements for certification

3. To establish evidence of occupational competence for advanced standing in undergraduate or graduate programs of study

They are designed to test the level of skill and knowledge of the candidate in his particular occupational field, as compared to other experienced people in the same occupation.

Two types of examinations are administered. The WRITTEN examination, consisting of multiple-choice questions, covers the information, knowledge and judgements a competent tradesman is expected to apply to his work.

The PERFORMANCE examination includes a variety of typical tasks a competent tradesman is expected to be able to perform.

The Scope of each examination lists the areas included in the examination and the proportion of test items from each area.

WRITTEN EXAMINATION

1. Candidates may take three hours to complete the written examination.

2. They will be notified as to the date, time and place of the examination.

3. A #2 lead pencil must be provided by each candidate.

Illustration 4

I. SCOPE OF THE WRITTEN EXAMINATION (Sample section)

A. Trade information, theory, facts and basic principles the applicant should know

1. Bench and Assembly Work, Layout and Inspection (percent of the exam 12%)

   a) Principles and procedures of layout work
   b) Interpretation of blueprints, drawings-sketches
   c) Principles of inspection and precision measurement
   d) Utilization of precision tools and measuring instruments
   e) Determination of Tolerances, specifications from drawings for proper sequence of operations-treatment of materials
   f) Hand tool, assembly and bench operations and utilization of proper tools

2. Machine Sawing, Filing and Multiple Parts Processing (3%)

   a) Principles of operations
   b) Special functions - filing - internal and external
   c) Cutting tools, blades - friction cutting
   d) Selection of blades, file chains, etc.
   e) Determination of feeds and speeds

3. Drilling, Tapping, Lapping - (Machines and Attachments) (5%)

   a) Sizes and capacities of machines and attachments
   b) Single spindle and multiple spindle production operations
   c) Principles of precision finishing - reaming - lapping
   d) Determination of tolerances and internal finishes
   e) Principles and methods of clamping work
   f) Determination of speeds and feeds
   g) Determination of sizes and kinds of drilling and tapping tools

4. Electrical Discharge Machining (4%)

   a) Principles of operation of electronic machining
   b) Operation and adjustment of controls
   c) Determination of limits and tolerances from blueprints and specifications
   d) Accuracy, tooling, size

Illustration 5

PERFORMANCE EXAMINATION

The performance part of the examination provides an opportunity for the candidate to demonstrate his level of proficiency in the manipulative skills and judgements essential to carry on the work of the occupation.

The scope of the performance part of the examination lists the skills, methods and procedures typical of the occupations from which the work sample jobs have been developed.

1. Candidates may take five hours to complete the work jobs.

2. Safety glasses are required and will be provided. Candidates may bring their own glasses.

3. Personal hand tools, such as micrometers and scales may be used.

4. Handbooks or reference materials may not be brought into the shop. They will be provided when necessary.

5. Appropriate work clothes should be worn.

6. Adherence to safety standards is mandatory.

II. SCOPE OF THE PERFORMANCE EXAMINATION (Sample section)

A. Trade skills, methods and procedures of operation the applicant should be able to perform:

1. Bench and Assembly, Layout and Inspection (15%)

   a) Layout of work, including center, reference, contour and dimension lines, surface preparation
   b) Using common hand and measuring tools, surface plate, vise and other holding or clamping devices, precision tools and gages.
   c) Filing, cutting, reaming, threading, fitting, polishing and lapping
   d) Testing and inspecting with precision inspection tools -- precision blocks, gages, indicators, hardness testers and comparator

2. Machine Sawing, Filing and Multiple Parts Processing (2%)

   a) Set up, weld saw blades
   b) Cut to a line
   c) Set up and file to a line
   d) Clamp regular and irregular shapes
   e) Sawing and filing angular surfaces

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

WORK SHEET III FOR THE SCOPE OF THE WRITTEN EXAMINATION

FOR _____(EXAMINATION TITLE)_____

1. Major Area % of Total Test Items

Subdivision

_____

_____

_____

_____

_____

2. Major Area % of Total Test Items

Subdivision

_____

_____

_____

_____

_____

3. Major Area % of Total Test Items

Subdivision

_____

_____

_____

_____

_____

IV. OCCUPATIONAL JOB CLUSTER ANALYSIS

A. Cluster Analysis for Skills and Information

This analysis should be made by one or more subject specialists assisted by a vocational teacher and a test technician. It should show the fundamental skills of the various occupations in the Job Cluster, indicate the frequency in which they are used and the difficulty or ease in which applied and what part they play in the overall competency of the occupation. It must, also, show the trade and technical information derived from the various sciences, mathematics, and communication practices of the occupation.

Work Sheet IV has been used effectively to carry on this part of the occupational content analysis.

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

WORK SHEET IV JOB CLUSTER ANALYSIS

Occupation _____ Major Occupational Area _____

Manipulative Skills and Methods	Frequency of Use			Difficulty			Occupational and Related Technical Information	Frequency of Use			
	All the time	Frequently	Occasionally	Very Difficult	Average	Easy		Very Often	Occasionally	Seldom	Comments

V. STEPS IN EVALUATING THE WRITTEN TEST

A. Preliminary Testing

Before pilot testing the examination with a group of candidates, it is strongly suggested that the test be administered to one or more individuals recognized and respected in the field for competence. This individual(s) should take the examination and later evaluate it for content, clarity, completeness and recency. This test might well lead to some revisions and modification. Such revisions, as may be necessary, must be made before the examination is administered to a pilot group.

B. Pilot Testing of the Written Examination

The completed examination should then be administered to a group of 10-15 tradesmen and/or trade teachers. The results must be tabulated for analysis and evaluation. Obvious test items can be corrected, others will reveal weaknesses through statistical analysis.

C. Evaluation of Pilot Test Results for Final Revision

Through item analysis, reliability and validity computation, a final appraisal must be made. Items too difficult, too easy or not clear must be eliminated, corrected or revised. A pool of additional test items reviewed for appropriateness, difficulty, completeness, etc. must be provided. If necessary, the revised form should be administered again. For helpful evaluative suggestions refer to Handbook _____ page _____.

D. Final Form of the Written Examination

The occupational competency examination should be arranged to follow the prescribed form which is later included under the directions forthe test developer.

VI. STEPS IN EVALUATING THE PERFORMANCE TEST

A. Preliminary Testing of the Performance Test

After the specification or drawing of one or more work job(s) is completed and before pilot testing the performance examination on a group of candidates, it is necessary to administer the performance test to an individual recognized and respected in the field for his competence. The evaluation should utilize the evaluation form and reveal whether the work assigned is appropriate in methods and representative of a certain competency level and whether the evaluation form is practical and can be used effectively and unobtrusively by an examiner. Revisions and modifications in the work sample should be made before pilot testing.

B. Pilot Testing the Performance Test

The performance test should be pilot tested by administering it to a group of candidates, the results evaluated, and all necessary revisions made before submitting the test in final form.

C. The Completed Performance Test

This part of the examination must include: (1) the specification and/or drawing of the work to be done by the candidate, (2) one alternate form, and (3) an evaluation or rating form which includes the evaluation of a finished product or a completed service, as well as the methodology employed.

PART TWO

TEST DEVELOPMENT

I. DIRECTIONS FOR THE TEST DEVELOPER

A. Information and Resources for Written Test Item Preparation

The cluster analysis for the skills and information provides the material from which the test items must be developed. The Scope of the written and performance examination, sometimes known as the examination specification, provides the percentage of the total test items which are to be formulated for each sub area. If the test item writer has participated in their preparation, he has them available. If others have carried on this work, the area test center coordinator will provide these items for him.

B. Test Item Form - Written Examination

The multiple-choice type of test item has been selected for the written part of the occupational competency test.

The test item writer should familiarize himself with the structure of the multiple-choice item and many different forms. The Handbook on the Development and Administration of Occupational Competency Tests: Volume 3 provides examples for test item development writing. As many variations of this type of test item described in the Handbook should be employed in the test to be written.

C. Construction of the Performance Test

A quality performance test representative of certain competency levels is difficult to construct. Care must be exercised in the selection of those skills and methods that are truly indicative of the competency of the occupation. The test constructor should review the Handbook before proceeding with the construction of the performance test.

Performance tests involve (a) instructions for the candidate and (b) specific directions for the examiner who will administer the test in a local situation. These must be prepared by the test constructor. The evaluation of the performance test requires a special evaluation form. The procedure for preparing the performance test and the supplementary information is described in detail in the following pages.

D. Constructing the Written Test

1. Test Item Preparation

The test items should be prepared by the subject specialists assisted by vocational teachers and test specialists. Some committees work together on each item. However, experience has shown that when each member assumes responsibility for a section of the occupational cluster and writes a specific number of test items which are then reviewed by the whole committee, the work proceeds more rapidly.

2. Recording the Test Items

The test items should be recorded on 5 x 8 cards in the manner indicated on Work Sheet V. This method of recording expedites the item evaluation and the organization of the examination.

3. The review should focus on clarity of phrasing and completeness of sampling. A sufficient number of additional test items, beyond those indicated in the Scope, must be written to provide for, at least, one alternate form. In the example above, 28 test items are required; at least, 75% additional test items are required for alternate forms. This review permits revision, elimination or additions of test items.

II. WRITTEN EXAMINATION FORMAT

A. Organizing the Examination

1. A variety of ways have been developed for the grouping of test items. For occupational competency tests with different achievement levels, various areas should be grouped separately in sections. Within each section, the sequence of difficulty is to be arranged in random order.

2. Organizing the test items may well be done by the test technician. However, the committee, as a whole, should review the examination for content, ease of reading, and speed ease and accuracy of recording the answers.

WORK SHEET V

FOR THE PREPARATION OF TEST ITEMS

Each test item should be written on a 5 x 8 card. The information must include the major and subdivision of the job cluster, the stem of the test item and the response answer choices. The response choices must be indicated by Capital Letters: A, B, C, etc.

Date: _____

MAJOR OCCUPATIONAL AREA: _____ Subdivision: _____

Code: _____

Stem of the Question: _____

_____

Alternate Choices

A. _____

B. _____

C. _____

D. _____

E. _____

The correct answer must be underlined in RED.

The Code should indicate the estimated difficulty level of the test item, and the frequency of application of the item. The following letters and numbers must be used:

Level of Difficulty - E - easy
A - average
D - difficult

Frequency of Use - 1 - all the time
2 - frequently
3 - occasionally
4 - seldom

28

Illustration 6

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROGRAM

OCCUPATIONAL PROFICIENCY EXAMINATION
MACHINE INDUSTRIES OCCUPATIONS
(MACHINE TRADES)

DIRECTIONS TO THE CANDIDATE

WRITTEN - FORM A

Directions: (NO MARKS ARE TO BE MADE IN THIS EXAMINATION BOOKLET.) Your name, identification number, and answers for all items are to be marked on the IBM answer sheet provided with this examination. Use a #2 lead pencil to make all marks on the answer sheet.

A. Print your name in the space on the top of the answer sheet.

B. Copy the Booklet Number from the upper right-hand corner of this page in the space provided for "Grade".

C. Enter today's date in the appropriate space.

D. Enter the name of the place, in which you are taking the examination, in the space after "city".

E. Copy the name of the test and the form letter in the space for "Name of Test".

F. Note the boxes below the red arrow on your answer sheet. Use these boxes to record your Social Security number. Then blacken the appropriate spaces to the right to correspond with the numbers in each box.

Directions for Recording Answers:

1. To mark each answer, make a heavy, black mark in the answer space next to the letter of the answer you think is correct. (NOTE: Items proceed in columns from left to right on the answer sheet.)

2. If you wish to change an answer, erase the old answer completely, then make a heavy black mark for the answer you think is correct.

3. Mark only one answer for each item. You should answer all items, since there is no penalty for guessing. Do not erase, fold, or make any stray marks on the answer sheet, since this may lower your score.

4. Time limit - 3 hours.

Illustration 7

Sample Page for Written Examination

(Multiple-Choice Form may Include a Four and/or Five Part Response)

Each of the test items or incomplete statements below is followed by four suggested answers or completions. Select the one which is best in each case.

1. In the process of surface hardening by nitriding, the surface becomes hard by absorption of nitrogen from

   A. oxygen gas
   B. hydrogen gas
   C. ammonia gas
   D. nitrogen gas

2. What is the proper tempering color for tempering a cutting edge?

   A. Blue
   B. Cherry red
   C. Straw
   D. Deep Purple

3. Which of the following non-ferrous metals can be hardened by heat treating?

   A. Copper
   B. Brass
   C. Bronze
   D. Beryllium copper

4. Induction hardening permits hardening of only one or several spots while leaving the remaining surfaces

   A. without change
   B. slightly softer
   C. slightly harder
   D. very soft

5. The term "soaking" in heat treating refers to prolonged

   A. heating at a selected temperature
   B. heating at a raising temperature
   C. heating at a decreasing temperature
   D. cooling at a decreasing temperature

6. What is the purpose of tempering or drawing high carbon steel?

   A. to prepare steel for further heat treatment
   B. to reduce brittleness
   C. to prepare steel for forging
   D. to arrest the hardening process at the proper carbon content

7. When machining a workpiece to be cyanide hardened and then ground, how much allowance on a side may the machinist allow for grinding?

   A. .005"
   B. .015"
   C. .020"
   D. .025"

B. Preparation of an Answer Sheet

The answers must be so designed as to indicate random order. The examinee must not be able to recognize or identify a pattern to the correct answers. The answers are to be indicated by capital letters rather than numbers. The answer sheet must be scorable by electronic data processing equipment. Scoring must be done efficiently, accurately, and confidentially. Illustration 8 represents a typical answer sheet.

Illustration 8

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
OCCUPATIONAL PROFICIENCY EXAMINATION
ELECTRONIC COMMUNICATION

KEY TO ANSWERS FOR WRITTEN TEST - FORM A

1. C	26. A	51. D	76. B
2. B	27. D	52. D	77. A
3. D	28. B	53. A	78. C
4. C	29. A	54. B	79. B
5. D	30. B	55. A	80. A
-	-	-	-
-	-	-	-
-	-	-	-
25. B	50. B	75. B	100. A

III. CONSTRUCTING THE PERFORMANCE EXAMINATION

A. Selection of Skills for the Work Job

From the content analysis, the committee must select a series of skills that are representative of the typical work jobs of the occupation. These skills must be representative of certain levels of competency. Care must be taken to have a sufficient range of skills. Highly specialized or unusual skills or tricks not typical or representative of certain levels of competency must be avoided.

B. Selection of Work Jobs

The performance test should provide an opportunity for the examinee to demonstrate his skill and the methods employed by a competent individual. For some occupations the finished product reveals both the skills and the method; for others, the simulation work sample is more appropriate and for still others the troubleshooting approach is required. The committee must make a choice as to which is most appropriate for a particular occupation.

C. Description of Work Jobs

The performance tasks must be clearly described, the length of time for each work job estimated and sketches/drawings prepared.

Work Sheet VI has proven to be effective in the preliminary planning and revision of performance tests.

D. Directions to the Candidate for the Performance Test

Most performance tests require certain instructions to the candidate. He must know:

1. The reference material he may use,

2. Any special information, characteristic of his occupation that he needs to be told,

3. The number of work jobs he is expected to complete,

4. The minimum and maximum time limits established for the performance examination, and

5. Any special directions the candidate may need when a work sample is not required to be completed.

Illustration 9 shows an example of such directions and Illustration 10 a typical drawing of a work sample job.

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

WORK SHEET VI FOR PERFORMANCE TEST

Occupation _____ Time _____

Major Area _____ Subdivisions

_____

_____

_____

1. Work Sample Test

   Sketches, Drawings, Wiring Diagrams, Circuits, specifications that show clearly what is to be done and completed.

2. Simulation Performance Test

   Must provide a clear description of the equipment, apparatus involved in the simulation. State specifically what method, procedure or technique is to be included in the simulation; also, the tools, materials and accessories required and the level of performance.

3. Troubleshooting

   Must provide a clear statement of the equipment to be used, the nature of the trouble to be introduced and the method by which it is to be accomplished. A statement must be included as to what particular competence is to be demonstrated in locating and correcting the induced trouble. Tools, accessories and supplies should also be listed.

WORK SHEET VII FOR THE SELECTION OF MANIPULATIVE SKILLS
FOR THE DESIGN OF PERFORMANCE TESTS

Major Occupational Area _____ Subdivision _____

Skills and/or Methods

A. 1. _____

2. _____

3. _____

4. _____

5. _____

B. 1. _____

2. _____

3. _____

4. _____

5. _____

C. 1. _____

2. _____

3. _____

4. _____

5. _____

D. 1. _____

2. _____

3. _____

4. _____

5. _____

Illustration 9

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
OCCUPATIONAL PROFICIENCY EXAMINATION
MACHINE INDUSTRIES OCCUPATIONS
(MACHINE TRADES)

DIRECTIONS TO THE CANDIDATE

PERFORMANCE TEST - FORM A

Name and Number _____ Date _____

Maximum time - 5 hours

Note:
1. The use of Handbook will be permitted.
2. The order in which the jobs are to be completed depend upon the shop facilities, and are determined by the examiner.
3. The candidate should follow his normal pattern of work to which he is accustomed in the trade. If any problems develop or questions arise, the examiner must be advised and consulted.
4. The candidates are expected to complete all jobs assigned to the performance test.
5. The candidate should ask the examiner for anything he needs, if it has not been provided.

Job I. Perform the necessary machining operations on the blank furnished by the examiner for the part shown on the attached drawing:

1. Square up part
2. Grind end and one narrow side square according to drawing
3. Mill slot - check with examiner before cutting
4. With precision tools, lay out location of holes and center mark
5. Drill and ream holes to size
6. Turn in paper used in computations with finished work piece

Job II. Machining part on lathe

1. Grind tool bit blanks, furnished by examiner, on a pedestal or bench grinder for use in machining Job II shown on the attached drawing.
2. Set up milling machine for cutting slots in edge of part, as shown on drawing.
   (a) Have examiner check the dividing head setup.
3. Lay out, set up and drill hole for tapping.
4. Turn in paper used in computation with finished work piece.

Job III. Drill Grinding

1. Obtain a drill 1/2" diameter or larger from examiner.
2. Grind drill by the off-hand method on a pedestal or bench grinder to obtain the standard cutting edge angle.
3. Return drill to examiner.

Job IV. Refer to print of Job III (part should be faced and center drilled).

1. Perform the necessary lathe operations on the material furnished by the examiner. The thread should fit the nut furnished.
2. Set up in shaper and cut a flat on the 1-1/2" diameter part 3/32" from circumference. This is optional - check with the examiner.

At the close of the examination, turn in:

1. All prints and instructions
2. Sheets with computations
3. Drawings I - II - III
4. Three tool bits
5. One drill

IV. EVALUATING THE RESULTS OF A PERFORMANCE TEST

A. Developing a Rating Form

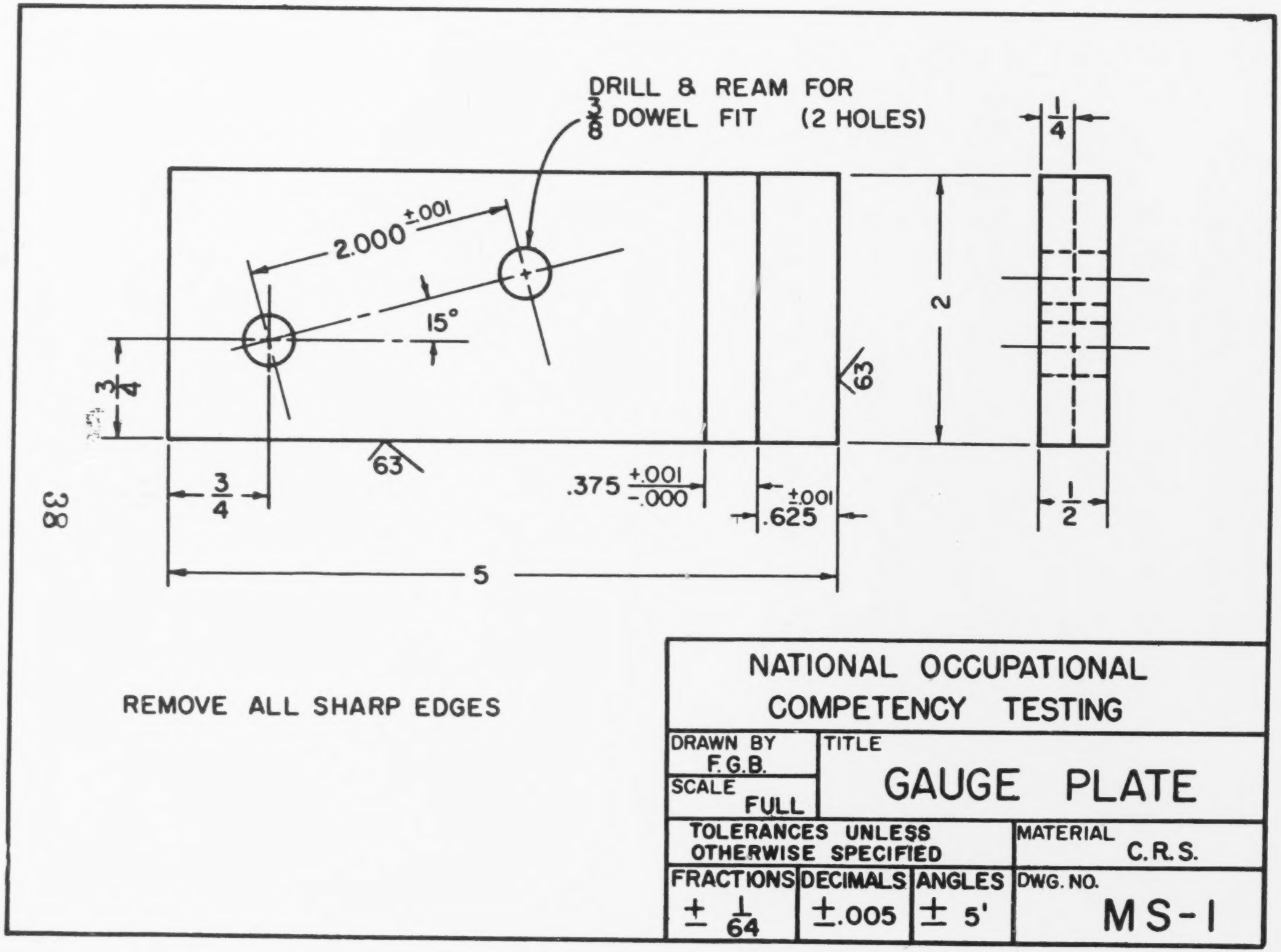
The performance test should not only reveal that a candidate can complete an assigned test but, also, whether he has mastery of the most efficient and acceptable methods.

Some occupations permit more objective evaluations than others. Frequently, more than one examiner is required to test a group of candidates. To assure that all candidates are evaluated on the same items, it is necessary for the test development committee to develop an evaluation form with a rating scale. Such rating form includes an appraisal of the important steps in the methods employed and an evaluation of the finished product.

Work Sheet VIII has been used to list the factors essential to both method and finished product evaluation.

Work Sheet IX has been used for evaluating the methods and techniques employed in locating and correcting malfunctions in equipment or apparatus. Illustration 11 represents a sample rating sheet for a work sample test and Illustration 12 a sample rating for a group of trouble-shooting tasks.

Illustration 10 Test Sample



NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

WORK SHEET VIII FOR PERFORMANCE TEST-FINISHED PRODUCT

EVALUATION FORM FOR: _____(Occupation)_____

Work Method and Finished Product Evaluation

Steps of Methods to be evaluated		Items of Finished Product to be evaluated	
Major Area	Point Value		Point Value
1. _____	( )	1. _____	( )
2. _____	( )	2. _____	( )
3. _____	( )	3. _____	( )
_____	( )	_____	( )
_____	( )	_____	( )
Total Value		Total Value	
Major Area			
1. _____	( )	1. _____	( )
2. _____	( )	2. _____	( )
3. _____	( )	3. _____	( )
Total Value		Total Value	

Final computation of the score

Special conditions to be observed

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Illustration 11

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
OCCUPATIONAL COMPETENCY EXAMINATION
(MACHINE TRADES)

PERFORMANCE RATING SCALE

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
OCCUPATIONAL COMPETENCY EXAMINATION
MACHINE INDUSTRIES OCCUPATIONS-MACHINE TRADES

Candidate's Name _____ _____
Examination Number
Location _____ Date_____

While the candidate is performing the assigned tasks, rate his performance according to the scale indicated for each subdivision. The top rating would be equivalent to an extremely able or competent worker. A good or above average worker would be rated 2 or 3 points below the top rating. The average worker rates at the midpoint. Workers with below average performance would rate 2 or 3 points below the midpoint, and the inept worker rates to zero. After he has completed the task, grade his finished product according to the dimension specified: deduct points for variations beyond normal tolerances. Check any weaknesses in box provided.

Bench and Layout Inspection

Observed Performance	Rating 0-10	Finished Product	Rating 0-10
() Handling of layout tools		() Accuracy	
() Planning of layout procedure		() Dimension lines	
() Preparation of surfaces		() Centers of holes	
() Filing - center marking		() Sizing holes	
() Tapping			
() Other tools	( )		( )

Turning Processes and Lathe Work

Observed Performance	Rating 0-10	Finished Product	Rating 0-15
() Set up of work		() Accuracy	
() Set up of tools		() Finish	
() Set up of accessories		() Knurls	
() Operation of lathe		() Other	
() Feed - speed	( )	() Tool bits	( )

Milling Processes and Machines

Observed Performance	Rating 0-15	Finished Product	Rating 0-15
() Set up of work		() Accuracy	
() Set up of cutters		() Finish	
() Set up of accessories		() Squareness	
() Feed - speed		() Appearance	
() Safety procedures	( )	() Burrs, marks, etc.	( )

Heat Treatment

Observed Performance	Rating 0-5	Finished Product	Rating 0-5
() Proper handling of part		() Proper hardness	
() Quenching procedure		() Proper tempering color	
() Tempering procedure			
() Safety	( )		( )

Drilling and Drill Press Work

Observed Performance	Rating 0-5	Finished Product	Rating 0-5
() Manner of clamping work		() Size of holes	
() Use of vise-parallels		() Location of holes	
() Use of tapping attachment		() Removal of burrs	
	( )	() Drills	( )

Grinding Processes and Machines

Observed Performance	Rating 0-15	Finished Product	Rating 0-15
() Set up of work		() Accuracy	
() Truing of wheel		() Finish	
() Dressing of wheels		() Squareness	
() Sequence of steps		() Formsand radii	
() Selection of wheels			
() Feeds and speeds			
() Safety practices			
() Coolants	( )		( )

Planer - Shaper Processes and Machines

Observed Performance	Rating 0-8	Finished Product	Rating 0-8
() Set up of work		() Accuracy	
() Set up of tools		() Finish	
() Feeds and speeds		() Other	
() Safety factors	( )		( )

Rating - Observed Performance _____

Rating - Finished Product _____

Rating - Overall _____

Examiner's Signature _____

(Give your personal impression of the candidate on the back of the sheet)

Points	Factors
4	Worker inept or out of practice
8	Worker with below average or limited facility
10	Average worker in the field
16	Good, above average worker
20	Extremely able, competent worker

The same proportions apply whether the ratings are indicated as 0-5, 0-8, 0-10, 0-15.

Please state your overall impression of the candidate as a worker in the field in the addition to the above score.

(The above is printed on the back sheet of Illustration 11.)

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

PERFORMANCE EVALUATION

WORK SHEET IX FOR PERFORMANCE TEST - TROUBLESHOOTING

EVALUATION FORM FOR _____

Troubleshooting and Diagnostic Techniques

Steps of troubleshooting to be evaluated	Score to be assigned
Major Area	
_____	( )
_____	( )
_____	( )
_____	( )
Major Area	
_____	( )
_____	( )
_____	( )
_____	( )

Computation of Final Score.

Special Conditions to be observed.

_____

_____

_____

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Illustration 12

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
OCCUPATIONAL COMPETENCY TEST
ELECTRONICS INDUSTRIES OCCUPATIONS (COMMUNICATION)

EXAMINER'S PERFORMANCE EVALUATION SCALE

Candidate's Name and Number _____

Place _____ Date _____

While the candidate is performing the assigned tasks, rate his performance on each job on the scale shown below, indicate any weaknesses in the last column.

The candidate should be rated on two features of his performance: a) his work methods, and b) the finished job. The following seven aspects of his work methods are to be used:

1. Does he approach the identification and location of the trouble systematically in a step-by-step manner?
2. Does he use the accepted trade method in correcting the trouble?
3. Does he select test equipment properly?
4. Does he perform hand tool operations skillfully?
5. Does he work neatly, accurately and safely?
6. Does he work at an acceptable speed?
7. Does he avoid excessive and inappropriate use of reference material?

In assigning ratings to the job performance, remember that the scores indicated are maximum and should be given only to the extremely competent candidate. (For a breakdown see the following sheet.)

Work Methods and Finished Job		Max. Score	Jobs								Comments: Weaknesses
			1	2	3	4	5	6	7	8	
a-1	Procedure in identifying and locating trouble	20									
2	Method of correcting trouble	15									
3	Selection and use of test equipment	10									
4	Skill of hand tool operations	10									
5	Neatness, accuracy and safety of work	5									
6	Speed	5									
7	Use of reference materials	5									
b-	SCORE FOR WORK METHODS	70									
	SCORE FOR FINISHED JOB	30									
	Total Score	100									

Final Score = $\frac{\text{Add all columns}}{\text{No. of Jobs}}$

Final Score: _____

Examiner's Signature _____

RATING DISTRIBUTION

4 - Worker inept or out of practice

8 - Worker with below average and limited facility

10 - Average worker in the field

16 - Good or above average worker

20 - Extremely able, highly competent worker

The same relationship should prevail when the maximum scores are 15 or 10 or 5.

These are just estimated average values, a rater should go above or below these figures if his judgment so indicates.

Please state your overall impression of the candidate's competence as a worker in the field, in addition to the numerical score.

_____

_____

_____

_____

_____

(The above is printed on the back of Illustration 12.)

V. DIRECTIONS TO THE EXAMINER

A. The candidate is entitled to know what he is being tested on. This information is presented in the Scope of the Written and Performance Examination on each examination: The examiner who administers the performance examination must prepare the shop or laboratory for this test. He must know the materials and supplies needed, the tools, accessories required, and the machines, apparatus and instruments on which the candidates are to be tested.

B. Illustration 13 shows general directions to the examiner for a performance test followed by Illustration 14 which shows a listing of jobs, machines, accessories required for each job and Illustration 15 is an example of the listing of tools, accessories and materials required. Preparing such listings facilitates the preparatory work of the examiner.

Work Sheet X provides a convenient way for the test constructor to list all the items indicated in Illustrations 13 - 15.

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

Directions to the Examiner - Performance Test

WORK SHEET X - DIRECTIONS TO EXAMINER: _____(occupation)_____

(To be used by Test Constructors to direct the examiner in the preparation of the shop or laboratory for the performance test.)

Job I. Provide the following:

A. Materials

_____

_____

_____

_____

B. Machine 1. (include all necessary tools and accessories)

_____

_____

_____

_____

C. Machine 2. (include all necessary tools and accessories)

_____

_____

_____

_____

D. Machine 3. (include all necessary tools and accessories)

_____

_____

_____

_____

Illustration 13

NATIONAL OCCUPATIONAL COMPETENCY PROJECT
OCCUPATIONAL PROFICIENCY EXAMINATION
MACHINE INDUSTRIES OCCUPATIONS
(MACHINE TRADES)

GENERAL DIRECTIONS TO THE EXAMINER

PERFORMANCE TEST - FORM A

Estimated maximum time - 5 hours.

1. Study the Scope and Directions to the candidate.

2. Study Manual for Administering Proficiency Examinations.

3. Use only the Performance Rating Sheets provided.

4. The purpose of this examination is to measure the candidate's occupational competency. No other judgment should be exercised. It is NOT the responsibility of the examiner to decide whether or not the candidate has teaching potential.

5. Do not allow candidates to discuss problems with each other.

6. Specific problems have been designated to test the candidate's ability to operate machines, use tools, etc. Do not alter the nature of the problem by substituting a different problem.

7. If facilities are available, permit the candidate to select the type of machine or tool he desires to use.

8. Provide such information, as drawings and handbook, that may be needed - also, the necessary tools, materials and accessories. Inform the candidate that they are available.

9. If it is quite apparent that the candidate is not skilled enough to perform the assignment, encourage him to move on to another assignment and then come back to the discontinued one if time permits.

10. Make sure that all machines, tools and equipment used for the test are in satisfactory working order, and are not specially set up.

11. Check the operation of each machine or equipment, after a candidate completes his work, to be sure it is in readiness for the next candidate.

12. Do not assist any candidate or make suggestions. If it is apparent that he is damaging any machines or equipment, you may interrupt the procedure to prevent this. Allow the candidate to complete the assignment, but record what has taken place on the rating sheet.

Illustration 14

NATIONAL OCCUPATIONAL COMPETENCY PROJECT
OCCUPATIONAL PROFICIENCY EXAMINATION
MACHINE INDUSTRIES OCCUPATIONS
(MACHINE TRADES)

DIRECTIONS TO THE EXAMINER

PERFORMANCE TEST - FORM A

Listing of Machines, Accessories and Materials Required for Each Job.

Time Limit - 5 hours.

This list has been prepared for your convenience, to be used in preparing the shop for the performance test. The candidate must be provided with the following items for each job. Determine the sequence in which the jobs are to be done, according to the machines and grinders available in the shop. Instruct the candidates as to the order of jobs in which to proceed.

Job I: Provide the following machines, accessories, tools and materials:

A. Material - For each candidate provide one piece of cold rolled steel, 1/2 x 2 x 5-1/8 plus extras.

B. Surface Grinder - with suitable wheel and guards.

Magnetic chuck
Wheel dresser
Clamps - parallel or "C"
Single cut or fine file or oil stone
Safety shield or goggles
Angle plate or precision vise
Solid steel square

C. Milling Machine - vertical or horizontal.

Vise
Parallels
Soft face hammer
Universal indicator
Milling cutters 3/8 - 5/16 - 1/4
Blocks and straps
Suitable tools to measure slot (vernier caliper, small hole gage, micrometer, adjustable parallels, inside calipers).
Assorted 3/8" reamers.
Vertical miller if used - drill chuck and adapters, center drill, set of letter drills

D. Layout Table or Bench

Layout fluid	Surface plate
Vernier height	Combination square
Bevel protractor	Sine bar (Jo-blocks or planer gage)
Center or prick punch	Ball peen hammer
Angle plate	6" Ruler
Dividers	0-1" Micrometer

E. Drill Press

Drill vise	Parallels
Soft face hammer	Center drill
Letter drills	Assorted reamers
Cutting fluid	Brush
Fine file or oilstone	

Estimated time - 1 hour 10 minutes

The completed work pieces, drills and tool bits must be submitted, placed in an envelope, checked and graded by the examiner at the conclusion of the performance test.

Each envelope must be properly identified with the candidate's name and number, and the examiner's signature.

Illustration 15

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
OCCUPATIONAL PROFICIENCY EXAMINATION
MACHINE INDUSTRIES OCCUPATIONS
(MACHINE TRADES)

DIRECTIONS TO THE EXAMINER

PERFORMANCE TEST - FORM A

Listing of Tools, Accessories and Materials Required for the Performance Test.

Time limit - 5 hours.

For your convenience in preparing the facilities for the performance examination, the following separate list of accessories, tools and materials has been prepared. When tools or accessories are used for an operation on several machines, the examiner must arrange for the number required and how to interchange them among the candidates when they are needed.

I. Materials - One for each candidate, plus several spares.

Job I: 1/2" x 2" x 5-1/8" cold rolled steel.
Job II: 1-3/4" diam. x 1-5/8" low carbon machine steel
Job III: 1-1/2" diam. x 5'1/2" long low carbon machine steel faced and center drilled at both ends
Job IV: One drill - 1/2" or larger - cutting edge dulled

II. Machines -

A. Drill Press - Drill chuck of appropriate capacity, drill vise - V-blocks, parallels, coolant and brush

B. Lathe - Chucks, drive plate, centers, tool holders (turning, parting, boring), micrometer stop (optional), tapered sleeves, taper attachment (if available, in sufficient numbers), #3 taper gage (optional), dogs, coolant and brush.

C. Milling Machine - Vertical or Horizontal

Vise	Blocks and straps
Index head (40 to 1 ratio)	Coolant and brush
Set of index plates	For vertical miller
Wrenches	appropriate chucks
Screwdrivers	and end mills

D. Surface Grinder

Suitable wheel and guards	Precision hand vise
Magnetic chuck	Wheel dresser

III. Tools & Accessories -

6" scale
0-1") Micrometers
1-2")
Vernier calipers
Vernier height gage
Dial indicator
Drill point gage or bevel protractor
Inside calipers
Telescoping gage
Hermaphrodite calipers
Dividers
Combination square set
Solid square-appropriate size
Bevel protractor
Sine bar & Jo-Blocks - if not available, provide Planer gage
Surface plate
Angle plate
Assorted pair of parallels
Parallel and C" clamps
Bench drill vise
V-block--suitable size
Center drills--appropriate size
Depth micrometer or vernier caliper
Thread micrometer
Thread gage
Pitch gage
Small hole gage or 3/8" dowel pin
Set of fraction drills
Surface gage and scriber
Center prick or marking punch
Small ball peen hammer
Layout fluid
5/8" drill
Drills 1/2" or larger
One set 1/4"-20 taps
Tap wrench
Countersink
Scraper
Assorted wrenches--screwdrivers
Soft-faced hammer or mallet
Fine cut files or oilstone
Chip brush & coolant
3 tool bit blanks (pre-identified)
Set of letter drills
Set of number drills
Set of 3/8" assorted reamers--(oversize, undersize, correct size)

A. Milling Machine - Vertical or Horizontal

Vise
Index head (40 to 1 ratio)
Set of index plates
Wrenches
Screwdrivers
Blocks and straps
Coolant and brush
For vertical miller appropriate chucks and end mills

B. Surface Grinder

Suitable wheel and guards
Magnetic chuck
Precision hand vise
Wheel dresser

Provide safety guards and/or goggles.

Let the candidate make his choice of methods, tools or accessories whenever practical.

Advise the candidate to ask for tools and accessories which he desires, but are not included in the list. The examiner should record such a request and report in his evaluation on the appropriateness of the request.

PART THREE

ADMINISTERING OCCUPATIONAL COMPETENCY EXAMINATIONS

Information necessary for preliminary preparation, administration and scoring of written and performance occupational competency examinations.

I. GENERAL INFORMATION FOR THE EXAMINERS

The proficiency examinations are divided into two separately administered tests: (a) the written test, and (b) the performance test.

The written test is usually administered to a large group of applicants. The performance examination is given to small groups with greater supervision and observation.

The scoring of test items on the written examination will be done by machine.

For the performance examinations, the scoring is more subjective and judgments must be made by the examiner as he observes the candidate's performance and records the observations and performance on a special scoring form with each examination.

A. Testing Procedures

Testing procedures must be uniform in all locations and by all examiners, to insure comparability of test results. The procedures should be followed, even though they may seem cumbersome to the examiners. If, for any reason, an irregularity occurs, a description of the nature of the irregularity should be noted in the appropriate section on the Examination Report.

B. Identification of Candidates

Examiners will be furnished with a list of names and Social Security Numbers and the specified test for persons who are to be tested.

Candidates are provided with admission notices; showing name, address, Social Security Number, and the name of the occupation. Candidates appearing without admission notices, may take the examination, if their names are on the list of candidates or its supplement.

Candidates who are more than 45 minutes late should not be admitted. An extension of time may be granted to individuals, if the lateness is due to difficulties encountered in traveling long distances or when time and place of examination are changed without adequate notice.

For candidates who are late, note the time of starting on the Examination Report, under "Individual Irregularities".

II. DIRECTIONS FOR ADMINISTERING THE WRITTEN EXAMINATION

A. Things for the Proctor to Do Prior to the Examination

1. Obtain specific directions relative to proctoring the written examination.

2. Obtain list of candidates expected for the examination.

3. Obtain examination papers, answer papers and other materials needed for the test.

B. Before the Examination Begins

1. Check condition of the examination room for proper heat, light, ventilation and adequate seating facilities and enter irregularities on the Examination Report.

2. Require candidates to identify themselves as they arrive.

3. Two candidates, taking the same examination, must be seated away from each other.

4. Supplies not specifically required for the examination are not permitted.

5. Check to be sure each candidate has a pencil or is given one by the examiner.

6. If other supplies, such as handbooks or slide rules, are suggested, the proctor should have a supply available for those candidates who did not bring them.

C. Distribution of Examinations

1. Make any special announcements that may be required.

2. Be sure all candidates are seated and ready to begin work.

3. Hand to each candidate the appropriate examination envelope. Do not allow the envelopes to be opened or any work to begin until you have given the "start" signal.

4. Say to the candidates, "Take the examination out of the envelope. (Pause) Put your Social Security Number on the line for the Name or Number and today's date, which is _____. Your name should not be put on the booklet, unless you do not know your Social Security Number. (Pause) Make sure your Social Security Number is entered on all work you hand in to the examiner. After you read the directions, you may begin work. Before leaving, place all your work and papers into the exam-

ination envelope, after completing the examination and are ready to check out. You may not leave the room for any reason, without first checking with me (or the proctor)".

D. What to Do During the Examination Period

1. Note the time when examination begins.

2. Permit no more than one candidate to leave the room at any one time.

3. No candidate may leave the room after another person taking the same test has checked out.

4. Be courteous if questions arise, but do not interpret the intent, or meaning, of a test question. Do not give any information to the candidate. Suggest that the candidate answer the questions as best he can.

5. If questions arise concerning possible errors in items (e.g. spelling, wording, ambiguity or errors in the alternatives), do not correct the error or announce it to the group. Again, tell the candidate only, "I cannot give you any information. Answer the item as best you can". (Do this even if there is no item error.) However, enter any possible error on the Examination Report in the Irregularities Section.

6. Be alert and circulate quietly around the room. The room may not be left unsupervised.

7. Stop work at the expiration of the allotted time, except for those who have official permission to continue.

8. As the examinees check out of the examination room, be sure that (a) the Social Security Number is on the examination answer sheet and all other papers, and (b) all test materials are put into his envelope.

9. Return all examination papers to the appropriate authority.

III. DIRECTIONS FOR ADMINISTRATION OF PERFORMANCE EXAMINATIONS

NOTE: THE EXAMINER IS RESPONSIBLE FOR ALL PREPARATION NECESSARY FOR THE EXAMINATION.

It is absolutely essential that the following steps be carefully followed. Deviations from these procedures will result in difficulties in administering and scoring the examination. As you complete each of the following steps, check the item off on the Examination Report form and, also, record any problems or irregularities. In this way, you will be adequately prepared for the examination, and will avoid needless hardships and time-consuming delays.

If you encounter any difficulties which you cannot handle in preparing for the examination, contact the appropriate person immediately, so that the problem can be solved prior to the date of the testing. Someone will check, prior to the date of the examination, to be sure that everything is ready, and will, also, check with you during the actual administration of the performance examination, since unexpected problems may arise.

A. Facilities for Examinations

Performance tests should be conducted in shops, or laboratories, equipped with appropriate and sufficient machines, equipment, hand tools and materials. Shops may be located in vocational schools or selected industrial establishments.

Specific directions, for conducting examinations for each occupation, will be placed in the hands of the examiner well in advance of the date of the examination.

In any case, he should analyze the test problems to determine amount and type of tools, equipment and other items needed for the number of persons scheduled to take the test. When the best available facilities are inadequate, arrangements should be made to supplement those at hand and bring additional equipment in order to conduct the test under the best possible conditions.

B. Supplies for Testing

Prior to the examination, the examiner should determine the materials and supplies needed to conduct the tests. In cases where supplies are not readily available and must be purchased, the examiner should consult the appropriate person.

C. What to Do Before the Day of the Examination

1. Read the "Directions to the Examiner" and "Performance Examination" for the examination being given.

2. Check to verify arrangements for time and place of the examination.

3. Visit the testing center to be sure that all equipment and tools necessary for the test are available.

4. Check all equipment to make sure that it is in good working condition.

5. Set up all tools, machines, equipment and working conditions, as nearly identical as possible, at each work station.

6. Prepare all partially completed test pieces and/or install defects or malfunctions into equipment for troubleshooting for the examination.

7. Check to make sure that all tools, materials and supplies are in a convenient location for each examinee.

8. Place all test materials in a large envelope for each candidate and mark it with candidate's name and Social Security Number.

9. Familiarize yourself with the scoring procedures.

THE ABOVE STEPS ARE TO BE COMPLETED AND RECORDED ON THE "EXAMINATION REPORT: PRELIMINARY CHECK-LIST FOR PERFORMANCE EXAMINATIONS" BEFORE THE DAY OF THE EXAMINATION.

D. What to Do During the Examination

1. Before actual work begins, permit the examinee to acquaint himself with his surroundings since the shop may be strange to him. Point out the location of such facilities, as electrical outlets, service facilities and other physical details.

2. Note the time each job is started and finished by each candidate.

3. Observe the candidate at his work. Check his work methods quietly and inconspicuously. Keep a record for your own purposes as the examination progresses.

4. Spend approximately the same amount of time with each candidate.

5. Check and rate each step of the job as it is completed by each candidate.

6. Tag or stamp each completed job with the candidate's number.

7. Maintain an impartial attitude at all times. It eliminates criticism and aids in reducing tension which, quite naturally, develops during the examination.

8. Provide handbooks, reference tables, etc., required in the examination.

9. Carefully record all ratings required on the "Performance Rating and Summary" form for the specific field.

E. What to Avoid During the Examination

1. Allow no more than one examinee to leave the room at any time.

2. Permit no work to be taken from the shop during the examination.

3. If any questions are raised concerning the meaning or intent of a job assignment, suggest that the candidate proceed according to his understanding.

4. Mark rating sheets away from the candidate.

5. Refrain from giving any information to a candidate concerning his progress or the probable result of the examination.

6. Refrain from discussing such matters as a candidate's occupational experience, his education, or personal problems.

F. At the Close of the Examination

1. Stop the work at the expiration of the maximum allotted time.

2. Collect all examination forms and directions.

3. Identify all test pieces with candidate's number.

4. Retain all finished work.

G. Completing the Scoring of the Examination

1. Most of the performance ratings can be made during the examination.

2. Inspect and rate all other completed work immediately after candidates have departed from the shop.

3. Use only the performance rating sheets provided.

4. Enter comments which have a bearing on the competency of the candidate on the back of the sheet. This is particularly important in cases where the performance is below average.

5. Sign the rating sheet in place provided for "Examiner".

6. Return all scoring sheets, question papers, prints and other materials which will be provided for each examination.

7. All totals will be computed at the National Occupational Competency Testing Project.

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NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT

- EXAMINATION REPORT: PRELIMINARY CHECK-LIST FOR PERFORMANCE EXAMINATION

Complete each step as listed below, filling in the date when completed.

1. _____ Have read "Directions to the Examiner" which are specific to the examination being given.

2. _____ Have read over the "Performance Examination", which is the actual examination the candidates take.

3. _____ Arrangements for the time and place of the examination have been verified with the Regional Coordinator.

4. _____ Visited testing center to be sure that all equipment, materials and tools necessary for the test are available. (See: "Directions to the Examiner" and the "Performance Examination" for the specific items that will be needed.)

5. _____ All equipment has been checked and is in good working condition.

6. _____ Tools, machines, equipment and working conditions have been set up, as nearly identical as possible, at each work station.

7. _____ All partially completed test pieces and/or defective equipment for troubleshooting are prepared and ready for the examination.

8. _____ Tools, materials, handbooks and supplies are in a convenient location for each examinee. (This should be similar to the typical work situation where he would select equipment from a choice of tools and supplies normally available. However, the examinee should not be required to spend time in securing stock and performing other preliminary work.)

9. _____ Job assignments, necessary drawings and other written directions, relating to the test, have been placed in a large envelope and marked with the candidate's name and Social Security Number. Partially completed items are available for the candidate.

I have completed the above steps, completely familiarized myself with all procedures I am to follow during the examination and have verified this with the Regional Director.

Signature _____ Date _____

(If there are any problems related to the above steps, or if you see any problems in administering the examination, contact the coordinator of the testing program.)

Illustration 17

NATIONAL OCCUPATIONAL COMPETENCY TESTING PROJECT
OCCUPATIONAL PROFICIENCY EXAMINATION

SAMPLE REPORT FORM OF IRREGULARITIES

OCCUPATIONAL PROFICIENCY EXAMINATION _____

Center _____ Date _____

Name	Social Security Number	Exam Title	Attendance		Individual Irregularities
			Present	Absent	(Defective test, illness, cheating, lacks notification, etc.)

Time examination began: _____ Time examination completed: _____

Possible Item Error: (Remember: The candidates are not to be told to change the item!)

Examination	Item Number	Description of Possible Error

Irregularities affecting all candidates: (e.g. overcrowding, power failure, distracting noises, emergencies over which you have no control, etc.)

Examiner's Signature _____